U

UNIFORM COMMERCIAL CODE

The Uniform Commercial Code (UCC) is a collection of recommended laws covering many different issues that arise during commercial transactions, such as sales contracts, leases, negotiable instruments, letters of credit, bank collections, and secured transactions. The impetus behind the creation of the UCC was the hope that each state would adopt it as a statute, thereby giving uniformity throughout the country to the area of commercial law.

HISTORY

The first draft of the UCC was created in the fall of 1951 by an editorial board consisting of representatives from the National Conference of Commissioners on Uniform State Laws and the American Law Institute. Pennsylvania adopted the draft as state law in 1953, but no other state enacted it until the editorial board issued a revised code in late 1956. After the revision, Massachusetts and Kentucky were the first to adopt the UCC. Today, all of the states (except Louisiana, which has only adopted certain parts) and the District of Columbia have adopted the UCC.

TOPICS COVERED BY THE UCC

Until 1987, the UCC consisted of nine articles. Each article was separate and distinct from the other articles, and covered a specific topic in commercial law.

Article 1 is entitled "General Provisions," and sets forth general definitions and principles of interpretation for all of the articles.

Article 2, "Sales," controls every stage of a transaction for the sale of goods, from general obligations, construction of a contract, and performance under that contract to breach, repudiation, and excuse of a sales contract. Article 2 also provides remedies for problems that may occur during a sales transaction.

Article 3 covers negotiable instruments, which include checks, cashiers' checks, travelers' checks, promissory notes, and certificates of deposit. This article regulates all transactions involving negotiable instruments, such as negotiation and endorsements; payment on the instruments; liability of parties such as the endorser, drawer, and acceptor; and dishonor of the instrument.

Article 4, "Bank Deposits and Collections," regulates collect items and post deposits, and governs the relationship among depository, collecting, and payer banks, and between a payer bank and its customer.

Article 5 addresses letters of credit, including the issuer's obligations, warranties that arise, and remedies that are provided for problems during the issuance process or after a letter of credit has issued.

In 1989, *Article 6* was revised and changed from covering bulk transfers to governing bulk sales. It regulates the obligations of a buyer of a bulk sale. A bulk sale generally involves the sale of more than half of the seller's inventory, not in the ordinary course of a seller's business, when the buyer has (or after inquiry would have had) notice that the seller is not going to continue to operate a similar business after the sale, including auction and liquidation sales. There are specific provisions for notice to claimants (such as creditors of the seller), distribution of the sale's proceeds, filing notices of bulk sales, and liability for noncompliance. This ensures that creditors are not bypassed when a company decides to end its business.

Article 7 governs warehouse receipts, bills of lading, and other such documents relating to ownership and transportation of goods.

Article 8, "Investment Securities," includes rules regulating the issuance of security certificates, the transfer and registration of securities, and the obligations of an intermediary who holds them.

Article 9 covers secured transactions, which occur when one party gives another a secured interest in a piece of property, usually to secure payment of a debt. The provisions of this article determine when a security interest may arise, the types of property that may be covered, the validity of the underlying security agreement, and the issue of default. Article 9 also covers the rights of third parties through a process called *perfection* of a security interest, which occurs when the holder of the security interest files notice of it with the state, so that other creditors know of the existence of the security interest.

Since the creation of the first nine articles, two more articles have been added to the UCC. Article 2A, approved in 1987, covers leases of personal property (not apartments or offices). Article 4A, added in 1989, regulates the issuance, acceptance, and payment of electronic funds transfers.

Article 2 of the UCC, which is widely considered to be the "bible" for contracts concerning the purchase or sale of goods in the United States, underwent a decade-long revision process that was finally completed in 2003. As of 2004, it appeared likely to be adopted by state legislatures and thus become the law of the land. The major impetus behind the changes was updating Article 2 to accommodate electronic commerce. When enacted, the revisions are expected to force both buyers and sellers to revisit their organizational contract management and administration policies.

SEE ALSO: Exporting and Importing; International Management

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UTILITY THEORY

Utility theory provides a methodological framework for the evaluation of alternative choices made by individuals, firms and organizations. Utility refers to the satisfaction that each choice provides to the decision maker. Thus, utility theory assumes that any decision is made on the basis of the utility maximization principle, according to which the best choice is the one that provides the highest utility (satisfaction) to the decision maker.

UTILITY THEORY IN CONSUMER BEHAVIOR

Utility theory is often used to explain the behavior of individual consumers. In this case the consumer plays the role of the decision maker that must decide how much of each of the many different goods and services to consume so as to secure the highest possible level of total utility subject to his/her available income and the prices of the goods/services.

UTILITY THEORY AND DEMAND

In addition to providing an explanation of consumer disposition of income, utility theory is useful in establishing individual consumer demand curves for goods and services. A consumer's demand curve for a good or service shows the different quantities that consumers purchase at various alternative prices. Factors that are held constant are consumers' tastes and preferences, income, and price.

UTILITY FUNCTIONS

In all cases the utility that the decision maker gets from selecting a specific choice is measure by a utility function U, which is a mathematical representation of the decision maker's system of preferences such that: $U(x) > U(y)$, where choice x is preferred over choice y or $U(x) = U(y)$, where choice x is indifferent from choice y—both choices are equally preferred.

Utility functions can be either cardinal or ordinal. In the former case, a utility function is used to derive a numerical score for each choice that represents the utility of this choice. In this setting the utilities (scores) assigned to different choices are directly comparable. For instance, a utility of 100 units towards a cup of tea is twice as desirable as a cup of coffee with a utility level of 50 units. In the ordinal case, the magnitude of the utilities (scores) are not important; only the ordering of the choices as implied by their utilities matters. For instance, a utility of 100 towards a cup of tea and a

utility level of 50 units for a cup of coffee simply state that a cup of coffee is preferred to a cup of tea, but it cannot be argued that a cup of tea is twice as desirable as a cup of coffee. Within this setting, it is important to note that an ordinal utility function is not unique, since any monotonic increasing transformation of an ordinal utility function will still provide the same ordering for the choices.

ASSUMPTIONS ON PREFERENCES

Irrespective of the type of utility function, utility theory assumes that preferences are complete, reflexive and transitive. The preferences are said to be complete if for any pair of choices x and y, one and only one of the following be stated: (1) x is preferred to y, (2) y is preferred to x, or (3) x and y are equally preferred. The preferences are said to be reflexive if for any pair of choices x and y such that x equally preferred to y, it is concluded that y is also equally preferred to x. Finally, the preferences are said to be transitive if for any three choices x, y, z such that x is preferred over y, and y is preferred over z, it is concluded that x is preferred over z. The hypotheses on reflexivity and transitivity imply that the decision maker is consistent (rational).

MARGINAL RATE OF SUBSTITUTION

A further assumption of utility theory is that decision makers are willing to trade one choice for another. The existing trade-offs define the marginal rate of substitution. As example suppose that two investment projects are considered by a decision maker. Project x has a return of 6 percent and a risk of 4 percent, whereas the return for project y is 5 percent and its risk is 2 percent. Furthermore assume that the decision maker considers both projects to be equally preferred. With this assumption it is clear that the decision maker is willing to increase the risk by 2 percent in order to improve return by 1 percent. Therefore, the marginal rate of substitution of risk for return is 2. In real world situations, the marginal rates of substitution are often decreasing. Such situations correspond to diminishing marginal utilities (marginal utility is defined as the change in total utility resulting from a one-unit change in consumption of the good or service). In the above example, we can assume that the decision maker is willing to take higher risks in order to get higher return, but only up to a specific point which is called saturation point. Once the risk has reached that point, the decision maker would not be willing to take any higher risk to increase return and therefore the marginal rate of substitution at this risk level would be zero.

MULTI-ATTRIBUTE UTILITY THEORY

The traditional framework of utility theory has been extended over the past three decades to the multi-attribute case, in which decisions are taken by multiple criteria. Multi-attribute utility theory has been evolved as one of the most important topics in multiple criteria decision making with many real world applications in complex real world problems.

The concept of utility can be used to analyze individual consumer behavior, to explain individual consumer demand curves as well as in modeling the decision makers' preferences. In all cases, it is assumed that some choices are evaluated and the best one is identified as the choice that maximizes the utility or satisfaction. The utility theory has been a research topic of major importance for the development of economics, decision theory, and management and it still attracts the interest of both practitioners and academic researchers.

SEE ALSO: Consumer Behavior; Economics

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V

VALUE-ADDED TAX

A value-added tax (VAT) is a fee assessed against businesses at each step of the production and distribution process, usually whenever a product is resold or value is added to it. A VAT is levied on the difference between the purchase cost of an asset and the price at which it can be sold (i.e., the amount of value added to it). Producers and distributors typically pass the cost of the VAT on to the final consumer in the form of price increases. Tax is added to a product's price each time it changes hands until delivery to the customer takes place, when the final tax is paid.

Value-added tax falls under the general category of a consumption tax, meaning taxes on what people buy rather than on their earnings, savings, or investments. VAT has also been referred to as a sort of national sales tax, though it functions very differently. Sales tax is imposed on the total retail price of the item sold, while VAT tax is imposed on the value added at each stage of production and distribution. And though more complicated than sales tax, value-added tax systems have more checks against tax fraud because the tax is assessed at more than one point in the distribution process.

THE VAT ASSESSMENT PROCESS

The process of assessing value-added tax occurs roughly as follows:

1. Manufacture adds value to a product; the amount of value added can be described as the difference between the cost of the materials used to make the product and the price charged to the customer (often a wholesaler).
2. The manufacturer pays value-added tax (a percentage of the value added), which is then included in the purchase price charged to the customer (wholesaler).
3. The manufacturer gets a rebate from the government for VAT paid on the materials.
4. The customer (wholesaler) pays a VAT on the value they add, which can be described as the difference between what they paid to the manufacturer and the price they at which they sell it to their customer (retailer). This VAT amount is included in the price charged to the retailer.
5. The wholesaler gets a rebate for VAT from the government for the VAT paid to the manufacturer.
6. The retailer pays value-added tax on the value they add, which can be described as the price charged to customers less the wholesale cost, and includes the VAT in the final sales price of the product.
7. The retail store collects value-added tax from the person buying the product (retail price thus includes all VATs collected at each stage of this process) and gets a rebate for the VAT paid to the wholesaler.

Value-added tax is a primary source of tax revenue in many European and other developed countries. With the exception of the United States, all countries of the Organization for Economic Cooperation and Development (OECD) use a VAT or similar tax on consumer expenditures. Though a value-added tax system has not been extensively used in United States, some presidents have examined the idea.

HISTORY OF VALUE-ADDED TAX

Value-added tax was first suggested in Germany during the post–World War I period as a replacement to the country's turnover tax. The turnover tax was similar to the value-added tax system but did not provide rebates for the taxes paid at each stage. Other proponents of VAT suggested that the United States adopt it as a substitute for excise taxes imposed after the War. However, it was not until 1953 that the value-added tax system was put in place in the United States or Europe. That year, Michigan adopted a modified VAT, termed a Business Activities Tax, and used the system for 14 years. France was the first country to begin using value-added tax to partially replace its own turnover tax system.

In 1967 the Council of European Economic Community (EEC) issued directives for widespread adoption of value-added tax to replace existing turnover taxes and link EEC members with a common tax system. The Council also hoped the new system would increase foreign trade, which was hindered by the complex regulatory practices of the turnover tax system. After the directive, countries outside the EEC such as Austria, Sweden, Brazil, Greece, and Peru also adopted some variation of the VAT, either in addition to or as a replacement for their own national tax structures.

A 1983 *U.S. News & World Report* article titled "What's Wrong with the System?" examined alternatives to the current tax system in the United States, citing problems such as complexity of tax laws, the expense of hiring professionals to prepare tax documents, and IRS backlog. One of the cited alternatives was value-added tax, by then widely used across Europe and other developed countries.

From 1987 to 1997, value-added tax was introduced in many eastern European countries, the former Soviet republics, and Asia. China, Thailand, the Philippines, and Bangladesh all implemented the policy during the mid-1990s. By the early 2000s, VAT had become the a key component of the tax systems in more than 120 countries, with tax rates varying from 5 to 25 percent. Writing in *Finance and Development,* Liam Ebrill claimed that "the rapid rise of the value-added tax was the most dramatic-and probably most important-development in taxation in the latter part of the twentieth century, and it still continues."

CHARACTERISTICS OF VALUE-ADDED TAX

There are three types of value-added tax used around the world, each different in the ways that taxes on investment (capital) expenditures are handled. The most common is the consumption method, which allows businesses to immediately deduct the full value of taxes paid on capital purchases. The second is the net income method, which allows gradual deduction of VAT paid on capital purchases over a number of years, much like depreciation. The third type, gross national product method of value-added tax, provides no allowance for taxes paid on capital purchases. The name of this type of tax is derived from the fact that the tax base is approximately equal to private GNP. The consumption method is most favored among general populations because it most equally taxes income from labor and capital and promotes capital formation.

In theory, value-added tax systems with a uniform rate are neutral to all forms of productive input. However, countries across the world have had to modify the VAT system with multiple rates and exemptions to meet political, economic, and social needs. Most nations do not assess any tax on necessities such as food, medicine, and shelter. And because of the difficulty in computing value added, professional services such as banking, accounting, and insurance are often exempt. The largest variation from uniform tax rates is the zero tax rate on exports. Since taxes will likely be assessed at a product's destination, many do not impose a tax on the final selling price of exports. To compensate, the VAT is applied to imported products. Working together, countries seek more balanced trade.

IMBALANCES IN THE VAT SYSTEM

Financial services have traditionally been exempt from value-added tax because no one has found a systematic, easy way to tax these services, partially because of the difficulty in determining the nature of services provided. Also, some wonder if it is fair to charge a tax on services often related to saving and investment.

Though some services are exempt from value-added tax, they must still pay the VAT on expenses such as office equipment; additionally, these business are ineligible for rebates on the VAT they pay. Therefore, exempt business sectors pay the total VAT on any good and service purchased. Often the cost of paying value-added tax is rolled into fees charged for the services offered. As a result of this imbalance, competition becomes greater, as companies can import services tax free, instead of buying services from a company whose price probably is inflated to absorb some or all of the hidden VAT taxes paid.

To remove such distortions in the economic effect of a value-added tax, a new method of taxing financial services would need to be devised. If these services were no longer exempt from value-added tax, they could reclaim prepaid VATs on equipment, etc., but they would also be required to charge VAT on any services offered. What complicates the matter further is categorizing which services are performed specifically on a customer's behalf and which are performed on the institution's behalf. Additionally, services performed for the institution as a whole still indirectly benefit consumers. These issues make for murky

ground when computing the value a service provider should be taxed upon.

The benefit of staying with the current system is that people are used to it. The option of charging VAT to financial services means added resources must be committed to changing existing VAT coverage and finding a way to measure value added for financial institutions. A third option is to look for a distinct way of taxing services while remaining under the value-added tax system. As an example, the European Commission was exploring the idea of taxing services on a cash-flow basis, taxing cash movement.

THE BENEFITS OF VALUE-ADDED TAX

One of the best reasons for instituting a value-added tax, according to VAT proponents, is that the system encourages personal savings and investment—principal elements of a healthy economy—by taxing only consumption. In the current United States tax structure, citizens pay taxes twice on money they save—once when income tax is withdrawn from their paycheck, and again when they pay taxes on the interest earned from savings and gains from investments. Similarly, the tax system in place in the United States encourages corporations to use debt financing, in which interest payments made by the company are tax deductible. Any dividends earned are subject to double taxation. And because taxes on capital purchases cannot be immediately deducted (only later as depreciation expense), the costs of capital investment increase. If a company does have a large asset base, it must generate more income to increase investor returns, subjecting itself again to higher tax payments.

Another benefit touted by VAT supporters is a more constant revenue flow. Tax revenues under the current U.S. structure rise and fall as a result of changing economic conditions, decreasing during recessions and growing during an economic boom. During recessionary periods, revenues may fall enough that government financial requirements utilize all available funds, and economic recovery becomes further delayed. Proponents of value-added tax believe it results in more financial stability and revenue flow.

Supporters of VAT for the United States view the system as a supplementary tax that could help make up for revenue lost due to personal income taxes, and believe imposition of a VAT may also result in general lowering of income-tax rates. They also assert that items such as food, medicine, and shelter should be exempt (as they are in other countries with a value-added tax structure) in order to maintain fair practices for those who must expend the majority of their income on basic necessities. It would also mean people who save and invest money realize benefits. Finally, VAT advocates maintain that the current tax system in the United States cannot raise sufficient revenue to support minimal government expenses.

A value-added tax would in theory eliminate the need for federal tax expenditures, which are largely responsible for depletion of federal revenues and increases in the national debt. Also, since the VAT is a consumption tax, people will be more motivated to save and invest disposable income. Additionally, a VAT would in some way reduce bias toward those who earn higher incomes. Tax write-offs can usually be taken advantage of only by those who itemize—meaning that they are available only to a small percentage of U.S. citizens, usually those with the highest incomes.

DRAWBACKS OF VALUE-ADDED TAX

Dropping the current tax system in the United States in order to adopt a VAT would require additional taxes on state and local services and products as well. Because value-added tax is similar to implementing a national sales tax, it impinges on territory currently occupied by states and local governments, and could add to the expenses incurred by cities and states by making them responsible for collection and enforcing compliance to the VAT system. It would require that every state rewrite its tax code, and could also add another tax layer for cities already charging state and local sales taxes. And while some cities could benefit from nontaxable export sales, others that depend primarily on domestic industry could face large losses in sales, resulting in declining revenues and lost jobs.

The prospect of a value-added tax also raises questions such as: Which goods and services purchased by cities would be federally taxed? Which provided by cities would be federally taxed? There would be no provisions for tax-exempt municipal bonds, which could mean an increase of up to thirty percent of finance costs for some municipalities. Deductions for state and local taxes, mortgage interest, investment in enterprise zones, housing, and jobs would also be eliminated. And cities with citizens who have less disposable income could stand to lose significant revenues with a consumption tax, revenues that would affect the public infrastructure and its investment in schools, roads, and utilities. VAT critics feel a de facto national sales tax will also reduce the amount of local funding states can expect from the local sales tax.

Because those with higher incomes spend a lesser proportion of their total wealth on consumption, households with lower income would still realize disadvantages and pay more tax proportionately than those who make more. However, adjustments can be made to value-added taxes so that taxation of food, housing, clothing, and medicine are given a zero or low tax rate. Also affecting citizens with lower incomes would be the fact that charitable contributions would no longer be deductible expenses.

Adding to the drawbacks, some economists feel that instituting a value-added tax would result in increasing prices and, as a result, inflation. U.S. economists have estimated the net effect of a VAT implementation as a five percent price increase. Also, assumptions that administrative costs would decrease with a value-added tax system may be erroneous. VAT-compliance costs to business would be higher, especially with special exemptions and multiple rate levels to consider. And the VAT would not eliminate income or payroll taxes completely, meaning the VAT would only add to administrative costs incurred.

A fairly recent complication in the administration of VAT systems involves electronic commerce. Though the sales of online retailers accounted for an ever-increasing percentage of overall sales of software, videos, and music, such sales were not subject to VAT. Governments in the EU and elsewhere planned to implement a VAT for electronic commerce in order to protect traditional retailers from unfair competition and create a new source of revenues. "New technologies are steadily drawing VAT into the realms of competition between tax regimes and presenting its architects with the problem of how legislation can be redesigned to reflect previously unimagined transactions, while preserving neutrality with the existing ones," Graeme Ross wrote in *International Tax Review.*

VAT IN THE UNITED STATES

Though the concept of value-added tax has met with considerable success outside the United States, U.S. policy makers have not yet warmed to the idea. The topic has been debated by economists since the post–World War I period but attracts only mild, sporadic support. The suggestion to adopt a VAT policy in the United States has been formally proposed at least five times since the early 1970s. Supporters are firmly convinced problems with the existing tax structure could be corrected with its adoption through the generation of revenues and subsequent stimulation of production.

VAT would replace individual and corporate income tax, as well as the Internal Revenue Service (IRS) and the almost $500 billion in related annual federal tax expenditures. However, deductions for mortgage interest, state and local taxes, earned income credit, and so on would no longer apply. Establishment of a value-added tax structure would directly change how state and local revenues are taxed. A VAT would require a determination of whether any taxable base includes state and local taxes, i.e., whether the price of a good or service had been calculated before or after any state and local income, property, or other taxes were applied.

On the import/export front, the United States loses by its lack of participation in a VAT system. With such a system, the country's large trade deficit could be improved. As provided by the General Agreement on Tariffs and Trade (GATT), prices for export goods can be discounted for some taxes, but not for income and social security taxes. But countries that use the VAT system can reduce prices by the total amount of VAT paid, giving them an economic advantage over the corporate and payroll taxes U.S. firms must pay. By adopting a VAT system and reducing the level of corporate, income, and payroll taxes, the United States could increase its export volume and U.S. firms would not be forced to lower prices to compete with other countries.

SEE ALSO: Exporting and Importing; International Management; Product Design; Product Life Cycle and Industry Life Cycle; Production Planning and Scheduling

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VALUE ANALYSIS

Lawrence D. Miles developed Value Analysis (VA) at General Electric in 1947. The technique simultaneously pursues two complimentary objectives: maximizing the utility provided by the product or service and minimizing or eliminating waste. Toward this end, the value content of the product or process realized by the consumer is defined. Using the user's definition of value as a filter, the product's components or the steps in the production or service-delivery process are classified as either value-added or non-value-added. The analyst's goal is to eliminate as

much of the non-value-added elements as possible by reengineering the design of the product or process. Equally important, the analyst also considers the possibility of substituting functionally equivalent elements for the value-added elements of the product or process design. In the latter case, a substitution is justified when the functionality of the element is maintained or enhanced at a reduced cost to the producer.

Value analysis may be applied to the design and redesign of products, services, and processes. All that is required is that the item under analysis be capable of being divided into mutually exclusive and collectively exhaustive elements. In the case of a product design, the product's bill of materials provides the necessary list of components. In the case of a service delivery or production process, a list of the individual tasks performed to achieve the ultimate objective are sufficient. The function of each product or process element is then identified and classified. Then the analyst must operationally define value within the context established by the product or process under review. Using this definition, each function is analyzed to determine whether or not and how it adds value. Finally, design changes may be proposed to eliminate, reduce, or replace elements that fail to add sufficient value to the overall product or process.

DEFINING VALUE

The first task facing the value analyst is to operationally define value within the context of a particular product or process. In doing so it is important to acknowledge that value is subjective. Just as beauty lies in the eyes of the beholder, value is highly dependent upon perspective. Therefore, it is useful to recall that all products and processes have multiple stakeholders. Indeed, in operationally defining value, the analyst might consider the perspectives of end consumers, individuals making the purchasing decision, suppliers, employees, managers, creditors, investors, regulators, and even the local community. While not all of these potential stakeholders will be concerned with every product or process, an initial consideration of which perspectives to consider is helpful in identifying a robust definition of value to drive the extended analysis. Frequently, the analyst will discover that the different perspectives will lead to conflicting definitions of value. While this complicates the task at hand, honing in on an acceptable definition of value often requires balancing competing demands.

The value-definition phase begins with the gathering of information. The value analyst should have a clear idea of the scope of the review expected. Then each stakeholders' perspective should be explored to determine what they consider to be valuable. What are the utilities expected to be provided by the product or the objectives to be achieved by the process? Are there specific operational goals that should be considered? For example, is there an expectation that all telephone orders will be delivered within twenty-four hours? At this initial stage, each stakeholders experience with the product or process should be broadly considered in order to facilitate the consideration of integrating complimentary elements in the product or process design. Information regarding stakeholder requirements may be revealed through direct observation, focus groups, interviews, surveys or other methods.

IDENTIFYING THE CURRENT STATE

The next step is to identify the as-is state of the product or process under review. In the case of a product design, this may be as simple as developing a bill of materials detailing the relevant components. In the case of a service delivery or production process, a flowchart is commonly used to graphically illustrate the tasks performed to achieve the current output. One of the primary purposes of creating an as-is representation is to ensure that existing problems are not duplicated in a new design. Information about component failures, warranty claims, and customer complaints can be quite valuable at this stage. A physical walkthrough to observe the flow of a process or dismantling of a product may also provide useful information. Any deviations between the as-is documentation and what the analyst sees should be recorded. It is also useful to note any differences between how different employees perform the same task or any variation of the same component provided by different suppliers.

FUNCTION ANALYSIS

The next step of the analysis is to determine the function of each element (each product component or each process task) identified in the as-is documentation. The convention is to use a verb-noun pair to describe the intended result or objective for each element-essentially what contribution the element makes. The verb answers the question "What is to be done?" The verb sets the action to be taken. The noun answers the question "What is it being done to?" The noun signifies what is acted upon. The activity of generating these pairs is more complicated than it appears to be. In practice, it is common to generate several verb-noun pairs that describe the objective or intended result of that element. For example, the function of a light bulb filament might be alternatively described as "generate light" or "convert energy." Each function is then classified as either primary or secondary. The primary functions are the basic reasons that the product or process exists. Secondary functions are those that serve to support or make possible the primary functions. These secondary functions are generally a consequence of the specific design chosen to achieve the product or process' primary function. Therefore, the design elements that

provide only secondary functions are prime candidates for elimination or improvement. They also provide a framework for evaluating the elements that provide the associated prime function. The analyst can examine the element providing the primary function to determine whether it can be replaced or redesigned in such a way that the need for the secondary support function is eliminated.

Distinguishing primary and secondary functions is sometimes difficult in practice. To address this concern, Charles Bytheway developed the Function Analysis System Technique (FAST) at Univac in 1964. FAST builds on the VA verb-noun pair analysis by linking those verb-noun pairs to describe complex systems. Bytheway's technique relied on a series of standardized fill-in-the-blank questions. By inserting the verb-noun functions identified through value analysis into the standardized questions, FAST seeks to identify the cause-and-consequence relationships among the various product or process elements. These relationships can then be graphed as a network diagram, with the verb-noun pairs representing the product or process elements as the nodes and the causal relationships represented as the arcs. FAST then identifies those elements that are essential to providing the product or process basic function as the critical path. Everything that falls outside this critical path is then considered as a prime candidate for elimination or improvement.

Bytheway's set of original questions for FAST includes the following:

1. What subject or problem would you like to address?
2. What are you really trying to do when you?
3. What higher level function has caused to come into being?
4. Why is it necessary to?
5. How is actually accomplished or how is it proposed to be accomplished?
6. Does the method selected to cause any supporting functions to come into being?
7. If you did not have to perform , would you still have to perform the other supporting functions?
8. When you , do apparent dependent functions come into existence as a result of the current design?
9. What or who actually?

VALUE-ADDED ASSESSMENT

The function of each design element is then reviewed against the operational definition of value to determine whether and how it contributes to the worth of the product or process. Although each situation is unique, several functions are commonly considered to be non-value-added. The following list is a small sample of highly suspect verbs:

- Administration: allocates, assigns, records, requests, or selects.
- Waiting or delay: files, sets up, stages, updates, or awaits.
- Motion or transportation: collates, collects, copies, delivers, distributes, issues, loads, moves, or receives.
- Oversight or control: approves, expedites, identifies, inspects, labels, maintains, measures, monitors, reviews, or verifies.
- Rework or repair: adjusts, changes, reconciles, repairs, returns, revises, or cancels.

However, identifying non-value-added design elements is only one aspect of the value assessment. The value-added elements should also be appraised. For example, assume that our evaluation has determined that the function of a bolt is to "attach-component." Our initial analysis reveals that this is a secondary function that supports the overall operation of our product and is therefore value-added. However, during the information-gathering phase of our analysis we discovered that several warranty claims can be traced to the failure of this bolt. Based upon this information we should then consider whether a substitute component might provide a higher level of value. In this situation we might consider a bigger, stronger bolt. If the revised design leads to fewer failures, our customers might experience fewer field failures. In addition, even though the new component presumably costs more than the original, we may find the overall product profitability improved if the reduced warranty claims offset the higher production costs. We might also choose to extend our analysis to consider other functionally equivalent components to the original bolt. Returning to our example, the function of the bolt was to "attach-component." Several other design elements might perform the same fastening function at either a reduced cost or improved performance level. A more complete analysis might consider substituting a screw, a rivet, adhesive, or even a weld for the troublesome bolt. Each potential substitution has its own implications for production costs and stakeholder satisfaction.

COMPARING ALTERNATIVE DESIGNS

A useful device for communicating the relative improvement of one design over another is to measure the value-added content of each product or process design. When evaluating alternative process designs, a common unit of measurement is elapsed time. This is generally accomplished by calculating the percentage

of time allocated to performing value-added tasks relative to the total process throughput time. In general, the process with the higher percentage of value-added activity will also have the shortest total throughput time. If this is not true, it probably indicates that the process output is significantly improved in the longer, but more value-added, process. In these cases, the absolute values for value-added and non-value-added activity may be more relevant. Another common unit of measure is manufacturing costs. In general, the accounting techniques of activity-based costing are used to allocate the costs to specific design elements. Again, either percentage or absolute measures may be appropriate for evaluating alternative designs. A third common objective, particularly for comparing product designs, is weight. The underlying rationale is that a lower weight generally indicates less material used-hence lower manufacturing costs. In addition, handling, transportation, and operating costs are also commonly reduced in proportion to product weight. Ultimately, the appropriateness of any unit of measure is dependent upon the product or process under review and the intentions of the value analyst.

SEE ALSO: Competitive Advantage; New Product Development

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VALUE CHAIN MANAGEMENT

Value chain management (VCM) is the integration of all resources starting with the vendor's vendor. It integrates information, materials, labor, facilities, logistics, etc. into a time-responsive, capacity-managed solution that maximizes financial resources and minimizes waste. In other words, efficient and effective value chain management optimizes value for the customers' customer. The following sections discuss the development of VCM, integrated supply chain planning and scheduling, full resource management, cycle time responsiveness, chain-wide resource optimization, and information integration.

DEVELOPMENT OF VALUE CHAIN MANAGEMENT

Using the previous definition as a basis, it is helpful to review how VCM was developed. Traditional industries focused on vertically integrated operations. For example, if you manufactured a product, you wanted to control the material sources, the transportation, the warehousing, the production, and possibly even the retailing of your product. The theory held that more vertical elements that were under your direct control, the more efficiently you were able to perform.

International competitive pressures caused organizations to realize that they simply were not good at everything; thus, they began to focus on what they did best. In other words, they focused on their core competencies. This shift away from vertical integration encouraged organizations to look outside of themselves for services. For example, a manufacturer would have a shipping company do all their packaging and shipping. This introduced more steps in the vendor-to-customer linkage, making the management of this process more complex.

The trend toward operational diversification focused organizations on developing a supply chain whereby an organization would establish a relationship with shippers, vendors, and customers so that all the linkages in the supply chain could be effectively integrated. These interrelationships became extremely complex to manage. Initially, the management of these relationships and linkages was primarily performance-based. Having too many linkages in the supply chain would often cause unresponsiveness to customer demands. Time-to-market became the buzzword of successful competitive positions; the organization that managed its supply chain most effectively tended to have the competitive advantage, at least in terms of customer responsiveness and order fulfillment.

Soon, managers realized that time responsiveness was not the only important element in customer satisfaction. The supply chain linkages-the links among upstream suppliers, manufacturers, and downstream distributors-also had a cost element and resource-efficiency element associated with them. This realization generated a need for value chain management, which is the management of all the linkages of the supply chain in the most efficient way. Sometimes this includes the elimination of elements of the supply chain; for example, Web marketing has eliminated the need for retail outlets.

Amazon.com is a well-known example of eliminating the need for physical "bricks-and-mortar" retail locations. Another example is Atomic Dog Publishing. This textbook company leases online textbooks to students for a semester. Because the texts are online, Atomic Dog has cut out an intermediary between text development and customers; in other words, Atomic Dog manages its value chain through disintermediation by eliminating the need for college bookstores.

Returning to the definition of value chain management, we can now look at the key aspects that are incorporated in VCM. These include:

- integrated supply chain planning and scheduling
- full resource management
- cycle-time responsiveness
- chain-wide resource optimization
- information integration

INTEGRATED SUPPLY CHAIN PLANNING AND SCHEDULING

The planning process for managing the supply chain is easy and has existed for many years. Systems like material requirements planning (MRP), manufacturing resource planning (MRP II), distribution requirements planning (DRP), theory of constraints (TOC), just-in-time (JIT), critical path method (CPM), and program evaluation and review technique (PERT) have performed the planning process effectively for the last 30 years. However, under these environments, capacity has been treated largely as an afterthought, and therefore scheduling has been plagued with performance challenges. The introduction of capacity management tools like finite capacity scheduling (FCS) into the existing planning environments has allowed the development of schedules that were optimizable both in timing and in cost. Most planning systems still do not include these scheduling elements, but rather focus on achieving delivery performance through the utilization of an overriding expedite process. FCS enhancements are a key piece in the development of efficient VCM environments.

FULL RESOURCE MANAGEMENT

Traditional environments focused on managing only the material resources, assuming all the other resources had an infinite capacity. This logical fallacy came from the limitations of the planning systems previously discussed. In a centrally-controlled environment where authoritarian rule existed, the expediting process could make this management style operational. Unfortunately, in a multi-stage supply chain integration, the scheduler needs to make sure that capacity limitations are considered at all steps in the supply chain. Expediting across the links of the supply chain was extremely difficult, if not impossible. For example, the constrained resource at one link in the supply chain may be entirely different than the constrained resource at another step in the supply chain. For one step, the constrained resource could be labor while at another step it could be truck capacity. Therefore, a scheduling system that analyzed and constrained all the resource elements at all steps became a critical piece in VCM.

CYCLE-TIME RESPONSIVENESS

Total cycle time measures are needed because they have, in many cases, become more important than cost when it comes to competitive advantage. Strategic positioning requires a supply chain to be able to supply a customized product at speeds quicker than anyone else, even if the product is not customized. Therefore, a measure of cycle-time performance, measuring the time from when the order for a customized product is placed until it is delivered to the customer, becomes as important as price.

CHAIN-WIDE RESOURCE OPTIMIZATION

Value chain management adds the evaluation not only of all the traditional resources like labor, materials, machinery, etc., but also the optimal management of time and financial resources. Realizing that the supply chain has more steps than existed in the traditional vertical model in which a single firm integrated many supply chain processes and functions within a single organization, the profit margins of each step have become smaller as firms became disintegrated in order to focus on one or only a few core competencies. This "disintegration" has created the need for profits to be available at multiple points throughout the value chain because each step in the chain needs to share a smaller piece of the overall margin pie. In order to accomplish this, value chain management focuses on value-added optimization (also referred to as waste elimination). Some organizations have interpreted this to include the elimination of steps in the supply chain, like the elimination of retailers at Amazon.com and elimination of the need for college bookstores by Atomic Dog Publishing. The efficient performance of all the remaining links in the supply chain is also carefully evaluated by each link.

INFORMATION INTEGRATION

VCM is meaningless if a near-total sharing of information does not exist among all elements of the supply chain. This incorporates multiple levels of information, from the operational information (which includes capacities and work loads), to the strategic

levels (which include vision and mission statements). This sharing of information has to be fully accessible and interactive, which often suggests some sort of Web-based database. Each link of the supply chain will need to be able to evaluate the efficiencies and performances of all the other links in the supply chain. However, this information network should not be available to elements outside of the immediate supply chain, like competitors. The shared information within the chain will primarily be utilized by each of the elements of the supply chain for their specific planning and scheduling. It will also be utilized by the sales/marketing functions to generate realistic schedules for the customer and end-consumer of the supply chain process. An overall finite capacity scheduling process that projects realistic and feasible schedules while simultaneously optimizing cost and timing will be necessary.

In summary, value chain management increases the number of steps in the supply chain by focusing on core competencies. VCM attempts to optimize the integrated efficiency of these steps in the management of resources, including the response time and the cost resource. Going into the future, VCM will become increasingly important as pressures to globalize mount, competition shrinks industry profits, and new market entrants challenge existing competitors.

SEE ALSO: Cycle Time; Lean Manufacturing and Just-in-Time Production; Supply Chain Management; Cycle Time

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VALUE CREATION

Value creation is the primary aim of any business entity. Creating value for customers helps sell products and services, while creating value for shareholders, in the form of increases in stock price, insures the future availability of investment capital to fund operations. From a financial perspective, value is said to be created when a business earns revenue (or a return on capital) that exceeds expenses (or the cost of capital). But some analysts insist on a broader definition of "value creation" that can be considered separate from traditional financial measures. "Traditional methods of assessing organizational performance are no longer adequate in today's economy," according to Value Based Management.net. "Stock price is less and less determined by earnings or asset base. Value creation in today's companies is increasingly represented in the intangible drivers like innovation, people, ideas, and brand."

When broadly defined, value creation is increasingly being recognized as a better management goal than strict financial measures of performance, many of which tend to place cost-cutting that produces short-term results ahead of investments that enhance long-term competitiveness and growth. As a result, some experts recommend making value creation the first priority for all employees and all company decisions. "If you put value creation first in the right way, your managers will know where and how to grow; they will deploy capital better than your competitors; and they will develop more talent than your competition," Ken Favaro explained in *Marakon Commentary.* "This will give you an enormous advantage in building your company's ability to achieve profitable and long-lasting growth."

The first step in achieving an organization-wide focus on value creation is understanding the sources and drivers of value creation within the industry, company, and marketplace. Understanding what creates value will help managers focus capital and talent on the most profitable opportunities for growth. "If customers value consistent quality and timely delivery, then the skills, systems, and processes that produce and deliver quality products and services are highly valuable to the organization," Robert S. Kaplan and David P. Norton wrote in their book *Strategy Maps: Converting Intangible Assets into Tangible Outcomes.* "If customers value innovation and high performance, then the skills, systems, and processes that create new products and services with superior functionality take on high value. Consistent alignment of actions and capabilities with the customer value proposition is the core of strategy execution."

Although the intangible factors that drive value creation differ by industry, some of the major categories of intangible assets include technology, innovation, intellectual property, alliances, management capabilities, employee relations, customer relations, community relations, and brand value. According to Kaplan and Norton, the link between these intangible assets and value creation is corporate strategy. It is important to note that investments made to enhance intangible assets (research and development, employee training, and brand building, for example) usually provide indirect

rather than direct benefits. In this way, focusing on value creation forces an organization to adopt a long-term perspective and align all of its resources toward future goals.

SEE ALSO: Competitive Advantage; Entrepreneurship; Intrapreneurship; Value Analysis; Value Chain Management

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VENDOR RATING

Vendor rating is the result of a formal vendor evaluation system. Vendors or suppliers are given standing, status, or title according to their attainment of some level of performance, such as delivery, lead time, quality, price, or some combination of variables. The motivation for the establishment of such a rating system is part of the effort of manufacturers and service firms to ensure that the desired characteristics of a purchased product or service is built in and not determined later by some after-the-fact indicator. The vendor rating may take the form of a hierarchical ranking from poor to excellent and whatever rankings the firm chooses to insert in between the two. For some firms, the vendor rating may come in the form of some sort of award system or as some variation of certification. Much of this attention to vender rating is a direct result of the widespread implementation of the just-in-time concept in the United States and its focus on the critical role of the buyer-supplier relationship.

Most firms want vendors that will produce all of the products and services defect-free and deliver them just in time (or as close to this ideal as reasonably possible). Some type of vehicle is needed to determine which supplying firms are capable of coming satisfactorily close to this and thus to be retained as current suppliers. One such vehicle is the vendor rating.

In order to accomplish the rating of vendors, some sort of review process must take place. The process begins with the identification of vendors who not only can supply the needed product or service but is a strategic match for the buying firm. Then important factors to be used as criteria for vendor evaluation are determined. These are usually variables that add value to the process through increased service or decreased cost. After determining which factors are critical, a method is devised that allows the vendor to be judged or rated on each individual factor.

It could be numeric rating or a Likert-scale ranking. The individual ratings can then be weighted according to importance, and pooled to arrive at an overall vendor rating. The process can be somewhat complex in that many factors can be complementary or conflicting. The process is further complicated by fact that some factors are quantitatively measured and others subjectively.

Once established, the rating system must be introduced to the supplying firm through some sort of formal education process. Once the buying firm is assured that the vendor understands what is expected and is able and willing to participate, the evaluation process can begin. The evaluation could be an ongoing process or it could occur within a predetermined time frame, such as quarterly. Of course the rating must be conveyed to the participating vendor with some firms actually publishing overall vendor standings. If problems are exposed, the vendor should formally present an action plan designed to overcome any problems that may have surfaced. Many buying firms require the vendor to show continuing improvement in predetermined critical areas.

CRITERIA FOR EVALUATION

Vendor performance is usually evaluated in the areas of pricing, quality, delivery, and service. Each area has a number of factors that some firms deem critical to successful vendor performance.

Pricing factors include the following:

- Competitive pricing. The prices paid should be comparable to those of vendors providing similar product and services. Quote requests should compare favorably to other vendors.

- Price stability. Prices should be reasonably stable over time.
- Price accuracy. There should be a low number of variances from purchase-order prices on invoiced received.
- Advance notice of price changes. The vendor should provide adequate advance notice of price changes.
- Sensitive to costs. The vendor should demonstrate respect for the customer firm's bottom line and show an understanding of its needs. Possible cost savings could be suggested. The vendor should also exhibit knowledge of the market and share this insight with the buying firm.
- Billing. Are vendor invoices are accurate? The average length of time to receive credit memos should be reasonable. Estimates should not vary significantly from the final invoice. Effective vendor bills are timely and easy to read and understand.

Quality factors include:

- Compliance with purchase order. The vendor should comply with terms and conditions as stated in the purchase order. Does the vendor show an understanding of the customer firm's expectations?
- Conformity to specifications. The product or service must conform to the specifications identified in the request for proposal and purchase order. Does the product perform as expected?
- Reliability. Is the rate of product failure within reasonable limits?
- Reliability of repairs. Is all repair and rework acceptable?
- Durability. Is the time until replacement is necessary reasonable?
- Support. Is quality support available from the vendor? Immediate response to and resolution of the problem is desirable.
- Warranty. The length and provisions of warranty protection offered should be reasonable. Are warranty problems resolved in a timely manner?
- State-of-the-art product/service. Does the vendor offer products and services that are consistent with the industry state-of-the-art? The vendor should consistently refresh product life by adding enhancements. It should also work with the buying firm in new product development.

Delivery factors include the following:

- Time. Does the vendor deliver products and services on time; is the actual receipt date on or close to the promised date? Does the promised date correspond to the vendor's published lead times? Also, are requests for information, proposals, and quotes swiftly answered?
- Quantity. Does the vendor deliver the correct items or services in the contracted quantity?
- Lead time. Is the average time for delivery comparable to that of other vendors for similar products and services?
- Packaging. Packaging should be sturdy, suitable, properly marked, and undamaged. Pallets should be the proper size with no overhang.
- Documentation. Does the vendor furnish proper documents (packing slips, invoices, technical manual, etc.) with correct material codes and proper purchase order numbers?
- Emergency delivery. Does the vendor demonstrate extra effort to meet requirements when an emergency delivery is requested?

Finally, these are service factors to consider:

- Good vendor representatives have sincere desire to serve. Vendor reps display courteous and professional approach, and handle complaints effectively. The vendor should also provide up-to-date catalogs, price information, and technical information. Does the vendor act as the buying firm's advocate within the supplying firm?
- Inside sales. Inside sales should display knowledge of buying firms needs. It should also be helpful with customer inquiries involving order confirmation, shipping schedules, shipping discrepancies, and invoice errors.
- Technical support. Does the vendor provide technical support for maintenance, repair, and installation situations? Does it provide technical instructions, documentation, general information? Are support personnel courteous, professional, and knowledgeable? The vendor should provide training on the effective use of its products or services.
- Emergency support. Does the vendor provide emergency support for repair or replacement of a failed product.
- Problem resolution. The vendor should respond in a timely manner to resolve problems.

An excellent vendor provides follow-up on status of problem correction.

A 2001 article in *Supply Management* notes that while pricing, quality, delivery, and service are suitable for supplies that are not essential to the continued success of the buying firm, a more comprehensive approach is needed for suppliers that are critical to the success of the firm's strategy or competitive advantage. For firms that fall into the latter category performance may need to be measured by the following 7 C's.

1. Competency—managerial, technical, administrative, and professional competence of the supplying firm.
2. Capacity—supplier's ability to meet physical, intellectual and financial requirements.
3. Commitment—supplier's willingness to commit physical, intellectual and financial resources.
4. Control—effective management control and information systems.
5. Cash resources—financial resources and stability of the supplier. Profit, ROI, ROE, asset-turnover ratio.
6. Cost—total acquisition cost, not just price.
7. Consistency—supplier's ability to exhibit quality and reliability over time.

If two or more firms supply the same or similar products or services, a standard set of criteria can apply to the vendor's performance evaluation. However, for different types of firms or firms supplying different products or services, standardized evaluation criteria may not be valid. In this case, the buying firm will have to adjust its criteria for the individual vendor. For example, Honda of America adjusts its performance criteria to account for the impact of supplier problems on consumer satisfaction or safety. A supplier of brakes would be held to a stricter standard than a supplier of radio knobs.

AWARDS AND CERTIFICATION

Many buying firms utilize awards and certification programs to rate vendors. Attainment of certification status or an award serves as an indicator of supplier excellence. Certification and awards-program recognition represents a final step in an intense journey that involves rigorous data collection under the total-quality-management-rubric as well as multitudes of meetings with suppliers and purchasing internal customers. Serious buying firms view these programs as an integral part of their overall efforts to improve the total value of the company.

The attainment of a supplier award usually serves as an indication that the vendor has been rated as excellent. Intel awards their best suppliers the Supplier Continuous Quality Improvement Award (SCQI). Other firms may utilize a hierarchy of awards to indicate varying degrees of performance from satisfactory to excellent. DaimlerChrysler awards its best suppliers the Gold Pentastar Award. Several hundred vending firms receive this award per year. However, only a handful (less than a dozen) of DaimlerChrysler's vendors are good enough to garner the Platinum Pentastar Award.

For other firms, supplier certification is desirable. Supplier certification can be defined as a process for ensuring that suppliers maintain specific levels of performance in the areas of price, quality, delivery, and service. Certification implies that participating firms have reached a level of excellence that other firms were unable or unwilling to achieve. For example a quality certified firm maintains a level of quality such that customer-receiving inspection may be utilized with decreasing frequency up to the point where it is eliminated altogether. Theoretically, this will ensure that all of the supplier's products meet the customer's product specifications. In this case, the goal of supplier certification is quality at the source.

While it is uncertain whether individual firms are consistent in the manner in which they certify vendors, a quality certification would likely require that the vending firm be part of a formal education program, utilize statistical process control (SPC), and have a quality assurance plan (set written procedures).

BENEFITS

Benefits of vendor rating systems include:

- Helping minimize subjectivity in judgment and make it possible to consider all relevant criteria in assessing suppliers.
- Providing feedback from all areas in one package.
- Facilitating better communication with vendors.
- Providing overall control of the vendor base.
- Requiring specific action to correct identified performance weaknesses.
- Establishing continuous review standards for vendors, thus ensuring continuous improvement of vendor performance.
- Building vendor partnerships, especially with suppliers having strategic links.
- Developing a performance-based culture.

Vendor ratings systems provide a process for measuring those factors that add value to the buying firm through value addition or decreased cost. The process will continually evolve and the criteria will change to meet current issues and concerns.

For example, some feel that supplier evaluation must now reflect the strategic direction of the buying company's environmental initiatives. As a result, some firms have recently developed supplier evaluation systems that place significant weight on environmental criteria. It would seem that the concept will remain valid for some time.

SEE ALSO: Purchasing and Procurement; Quality and Total Quality Management; Supply Chain Management

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VENTURE CAPITAL

Venture capital refers to money that is invested in companies during the early stages of their development. Such funds may come from wealthy individuals, government-backed Small Business Investment Companies (SBICs), or professionally managed venture capital firms. Since investing in an unproven business venture is highly speculative, venture capitalists generally target companies that they believe offer significant potential for growth, and therefore an opportunity to earn a high rate of return in a relatively short period of time. In exchange for providing capital, as well as a source of management assistance and industry contacts for growing firms, the investors usually require a percentage of equity ownership in the company, some measure of control over its strategic direction, and payment of assorted fees. "Private equity provides capital and access to a network that can transform a company into an industry player," Karen E. Klein noted in *Business Week.* "But the price is high: a chunk of your business."

Like other sources of equity financing, venture capital offers both advantages and disadvantages. The main advantage is that the business is not obligated to repay the money. For a start-up company, this frees up important cash flow that might otherwise be needed to service debt. The involvement of high-profile investors may also help increase the credibility of a new business. The main disadvantage to venture capital financing is that the investors become part owners of the business, and thus gain a say in business decisions. The company's founders face a dilution of their ownership positions and a possible loss of autonomy or control.

Even for business owners willing to make the tradeoff, venture capital is scarce and often difficult to obtain. Venture capitalists tend to be highly selective in choosing investments. Some will only consider investments in specific technologies, industries, or geographic areas. In fact, the larger venture capital firms typically reject more than 90 percent of the requests for funding that they receive. They evaluate the remaining requests thoroughly, and at considerable expense, before selecting a few that closely match the investors' areas of expertise and offer the best earnings potential. As a result, private equity financing is more likely to be an option for existing businesses with a solid track record and good prospects for future growth than for start-up companies. It is a particularly good choice for fast-growing companies that have few tangible assets to use as collateral for loans.

For a business owner, the process of obtaining venture capital begins with a formal proposal. The most important element of this proposal is a detailed business plan describing the company's goals and strategies. The proposal should also include recent financial statements, projections of future growth, a brief history of the company, biographies of key managers, the amount of money requested, and a description of how the funds will be used. Experts recommend that companies seeking equity financing evaluate several venture capital firms before entering into a deal. Managers should also hire professionals to help them understand the terms of the agreement to avoid giving away too much control.

On receiving a proposal of interest, a venture capital firm usually follows up with a thorough investigation of the company's investment potential. This process might include analyzing financial statements, interviewing customers and suppliers, and meeting with the management team. If the venture capital firm remains interested following the evaluation phase, it usually responds with a proposal of its own, known as a term sheet. The term sheet acts as a blueprint for the investment deal, with provisions covering such issues as the valuation of the investment, voting rights, and liquidation options.

The final terms are decided through negotiations between the business managers and the venture capital firm. One of the most important factors in the negotiation

process is agreeing upon the valuation of the business, which determines the amount of equity that is required in exchange for the venture capital (a business with a low valuation must provide a high percentage of equity, and vice versa). As a general rule, venture capital firms seek to control between 30 and 40 percent of equity in the companies in which they invest. This amount allows the venture capital firm to exercise influence without assuming control or eliminating the management team's incentive to grow the business. The venture capital firm usually hopes to achieve a return of three to five times the original investment within five years, by selling its equity either to the company's management or on the public stock markets.

Overall, venture capital can provide a valuable source of financing for growing businesses. Because of its associated risks, however, experts generally suggest that it be viewed as one of a number of potential sources of financing and be used in combination with debt financing whenever possible. "Private equity isn't for the faint of heart," Klein acknowledged. "But then again, entrepreneurs aren't known for being timid."

SEE ALSO: Due Diligence; Entrepreneurship; Financial Issues for Managers; Financial Ratios

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VIDEOCONFERENCING

Videoconferencing is a communications system that allows people in separate locations to talk to and see each other using live audio and video. A point-to-point videoconference connects individuals at two separate sites, and a multi-point conference connects individuals at more than two sites simultaneously.

Equipment ranges from sophisticated room-based systems to laptop systems, future developments are occurring for use in 3G cell phones and wireless devices. The most common uses of videoconferencing in corporate environments relate to training activities and meetings, but videoconferencing is also used for sales, job interviews, customer service, product demonstrations, technical and engineering collaboration, and troubleshooting. Increasingly, corporations use videoconferencing in new areas to fit more specific needs, especially as technology make collaborative features easier to use.

There has been an upward trend in utilization of videoconferencing and web-conferencing software in the corporate setting since the terrorist attacks of 2001. Increases in travel costs, travel safety concerns, and the slow economy have all led to the employment of alternative methods of collaboration and communication. Lending increased interest to alternative methods are improvements in technology, declining product prices and the development of standards, which allows better communication among a variety of videoconferencing systems. Networks capable of offering high-speed broadband, both wired and wireless, and improved Voice over Internet Protocol (VoIP) are also contributing to increased usage in web and videoconferencing specifically.

KINDS OF PRODUCTS/SYSTEMS

Room-based videoconferencing generally involves a sophisticated system that is built into a conference room, often specially designed and wired for this purpose. Also known as a boardroom system or a conference room system, this option is appropriate for large groups because cameras can focus on an individual speaker as well as include the entire group. Equipment includes a screen or monitor, projectors, microphones, PCs, and cameras that focus on participants as well as documents or other prepared visual aids.

A *roll-about* or *roll-around* system is a portable system on wheels that can move around the office and be plugged into a socket. This system is appropriate for frequent communication between small groups. Such portable systems may provide functions similar to those of room-based videoconferencing, with the possibility of plugging in additional equipment according to the needs of users. Models are produced for use at both high and low bandwidths.

A *personal* or *desktop* system, uses a personal computer and includes a small video camera that can be positioned on the user's computer and monitor. Typically, a fixed-focus camera and headset provide

audio and head-and-shoulder images-the "talking head"-to the other individual participating in the conference. On the screen, several windows show the image of the other participant(s) and any shared documents. Such systems are appropriate for individuals and small groups.

The availability of free services, via Yahoo Messenger, AOL Instant Messenger, and Microsoft NetMeeting/Messenger, allow even the smallest of companies/groups to utilize this increasingly popular medium. In addition to basic video feeds and/or audio feeds, these free services also provide document sharing, whiteboard usage, and URL sharing (each person looking at the same webpage together). These extended capabilities in communication and feedback are available to any user equipped with an internet connection, web camera, and microphone (sometimes bundled into the webcam equipment).

As an alternative to purchasing a system, some vendors offer the use of videoconference facilities or rent studio space.

VIDEOCONFERENCING IN USE

BENEFITS. Videoconferencing allows individuals to interact and communicate visually without having to gather at a single site. The most frequently cited benefits concern reduced travel and accommodation costs and saved time. Less easily quantifiable benefits relate to the opportunity this technology provides for collaborative work. It allows access to remote expertise and a wider range of individuals, and because it is interactive, it can lead to increased speed of decision making, cost-effective use of training time, group problem solving and the chance to establish rapport. Videoconferencing used for customer assistance has been linked to increased customer satisfaction.

LIMITS. Like any scheduled meeting, a videoconference, particularly one involving room-based systems and groups, requires organization and planning around the schedules of participants and technicians. Despite improvements in technology, barriers to increased use continue to be choppy images and poor audio, depending on the system used and its ability to maintain connection speed, which in turn depends on the kind of connection. Accommodations must be made if there is a possibility of delayed connections or if the resolution does not allow certain character sizes on visual aids to be distinguished. In some cases it may be necessary to overcome a lack of user acceptance.

Some new users report being uncomfortable with the unfamiliar technology and having trouble with nonverbal cues such as making eye contact; in these cases preparation or training may help. If customers or potential customers are involved, incentives or facilitators on the premises may be helpful until the customers get accustomed to this technology.

EFFECT ON HUMAN COMMUNICATION. Remote technology has been shown to affect human communication mainly due to the lack of cues normally present in face-to-face live interaction. For example, eye contact differs, and if the resolution is poor, it is not possible to look into people's eyes to gauge the degree of interest or attention. The feedback normally expected may be missing or delayed if there is a slight time lag. Turn-taking may also differ, even if the delay amounts to only a fraction of a second.

Preparation or training should be considered in terms of intended use (for example, a one-time meeting of groups of possible trading partners as opposed to regular team meetings) and the technical characteristics of the system (for example, whether or not audio can be simultaneously transmitted and received without any interference). New users and virtual teams need to be aware of factors that may lead to hesitancy or initial uneasiness, which in turn effect communication. Some experts recommend that people meet face-to-face before working remotely as a team in order to overcome possible effects of these factors. For example, if people know each other already, they can treat inadvertent interruptions lightly. On the other hand, videoconferencing can be used for introductory meetings; participants need only be aware of possible limits.

Some techniques enhance the use of video. Looking into the camera as much as possible will help maintain eye contact. If the camera is located close to the image on a screen, looking at the individual produces a similar effect. Notes can be inserted on the monitor with some software; otherwise a good position for note cards is next to the camera. Trainers recommend practicing, including speaking with an inanimate object to get used to speaking to a camera.

APPLICATIONS. As technology improves, applications are moving beyond the meetings and training activities usually associated with videoconferencing in business. Applications actually encompass a wide range of activities. For example, videoconferencing can be used for customer service and sales. Engineers or specialists can provide customer service and support using video images, and they can show new product applications. In the salesroom, it can provide customers with advice or explanations from specialists with the aim of complementing the activity of sales personnel. Many consumer websites, from online storefronts to financial institutions, host internet websites that offer video assistance combined with text-based chat to serve customer needs.

In the area of quality control, hand-held cameras can be used on the factory floor to discover problems

or detect faults before they cause lengthy delays in production. These cameras can be used for troubleshooting, with a team of experts able to interact and reach a solution.

Videoconferencing is also used for trade promotion, with the conference itself conducted as a special event. Members of a business-related association in one area may meet with a group of businesspersons based in a different country to present their companies or products. Videoconferences are also used to provide investors with updates by the chief executive or the chief financial officer of public companies.

TECHNICAL CONCERNS

General concerns include interoperability: whether a system can interface with other conferencing systems via physical network facilities. Another factor includes ease of use. An easy to use interface is particularly important when built-in collaboration features are used. Video and audio quality must also be considered.

VIDEO AND AUDIO QUALITY. Although video quality has improved since the appearance of early systems, with some vendors comparing their products to television video, not all systems in use offer the video quality typical of television. This is in part due to the frame rate, which refers to the maximum amount of full-screen images transmitted per second. The frame rate for the full-motion video normally seen on television is about 30 frames per second. Roughly speaking, the lower the frame rate, the choppier the image. A system providing 15 frames per second will most likely exhibit some choppy images or jerky movements, but this frame rate may be considered sufficient for certain kinds of business meetings. The capability of a system to deal with excessive screen motion is also a factor in determining video quality, while image clarity relates to the number of pixels defined per image.

The synchronization of voice transmission and lip movement depends on whether or not there is a delay or lag in the time it takes to receive a video image and audio signals. If the audio is poorly synchronized, the speaker's lip movements will follow the sound after a fraction of a second or more.

NETWORKS/VIDEO TRANSPORT. A common network used for video transport is the Internet via DSL (digital subscriber line) or Cable. Other networks are ISDN, local area network (LAN), asynchronous transfer mode (ATM), and the plain old telephone system (POTS).

INTERNET VIA DSL AND CABLE. Systems allowing videoconferencing over the Internet are increasingly common, with compatibility and ease-of-use issues still encountered from time-to-time. Bandwidth is high enough to allow for continuous transmission of motion video and audio.

ISDN. ISDN is available from telephone companies, with charges to subscribers based on the amount of data transmitted. This network generally allows 15 to 25 frames of live video per second depending on image size. ISDN has been used for room-based conference systems, but it is also used for personal/desktop systems.

LAN. Videoconferencing over the local-area network (LAN) utilizes the system that already connects an organization's computers. With network video conferencing, software on a desktop or laptop PC or in a conference room can be used to make a video call on the premises or to a distant location. However, because of video's bandwidth requirements, certain kinds of traffic may suffer as a result of videoconferencing on a LAN. As a result, each call may impact the quality of service on a LAN (as well as on a wide-area network—WAN, which connects distant locations belonging to the same organization). Technical features that allow users to select how much bandwidth they want for a call result in a more efficient use of bandwidth.

ATM. ATM is a network technology based on transferring data in relatively small cells or packets of a constant size. This allows ATM equipment to transmit video, audio, and computer data over the same network without one kind of data monopolizing the line.

POTS. POTS allows 7 to 12 frames per second, which results in jerky images. It is mainly used for consumer applications. Video and sound quality and poorly synchronized audio remain sticking points for POTS technology.

STANDARDS FOR VIDEOCONFERENCING. Standards must be defined in order to allow different products to communicate with each other. The most frequently used standards are H.320 for video over ISDN and H.323 for video over IP (Internet Protocol). Improvements and advances in broadband and wireless, are increasing the usage of the H.323 standard. H.310/H.321 covers ATM for sites with an ATM network; H.234 covers POTS video, which is being used less and less as affordable consumer broadband and wireless options are being utilized.

OUTLOOK

With improved high-speed broadband becoming a common household amenity, the opportunities for business to be conducted in corporate and home office locations is now possible. Video, audio, data, and especially systems integrating all three are expected to take precedence over the larger, dedicated systems, especially when a hard-wired room is required.

Corporate video conferencing is the largest segment of the videoconferencing market and is projected to jump from $6 million in 2003 to nearly $180 million by 2008, according to Wainhouse Research. In 2004, according to Wainhouse's *Videoconferencing Endpoint Survey,* more than 70 percent of those surveyed claimed to use group videoconferencing as part of their job, and nearly 75 percent of respondents noted an increase in the use of videoconferencing in the past two years and anticipated an increase in usage in the coming years. Respondents indicated they believed that the future of videoconferencing would be primarily via web conferencing or instant-messaging services and secondarily via desktop video conferencing.

The growing use of videoconferencing is expected to lead to changes in approaches to teamwork, business communication practices, and presentation techniques. Face-to-face communication may take on greater significance if it becomes increasingly reserved for initial meetings, key relationships, and special situations. As more and more people use personal or desktop systems, videoconferencing will be seen as a normal on-the-job activity, involving a wide range of applications and benefits. Further developments in wireless technology and video-capable appliances will make this industry exciting for both personal and corporate usage.

SEE ALSO: Computer Networks; Virtual Organizations

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VIRTUAL ORGANIZATIONS

The term *virtual organization* is used to describe a network of independent firms that join together, often temporarily, to produce a service or product. Virtual organization is often associated with such terms as virtual office, virtual teams, and virtual leadership. The ultimate goal of the virtual organization is to provide innovative, high-quality products or services instantaneously in response to customer demands.

The term *virtual* in this sense has its roots in the computer industry. When a computer appears to have more storage capacity than it really possesses it is referred to as virtual memory. Likewise, when an organization assembles resources from a variety of firms, a virtual organization seems to have more capabilities than it actually possesses.

BACKGROUND

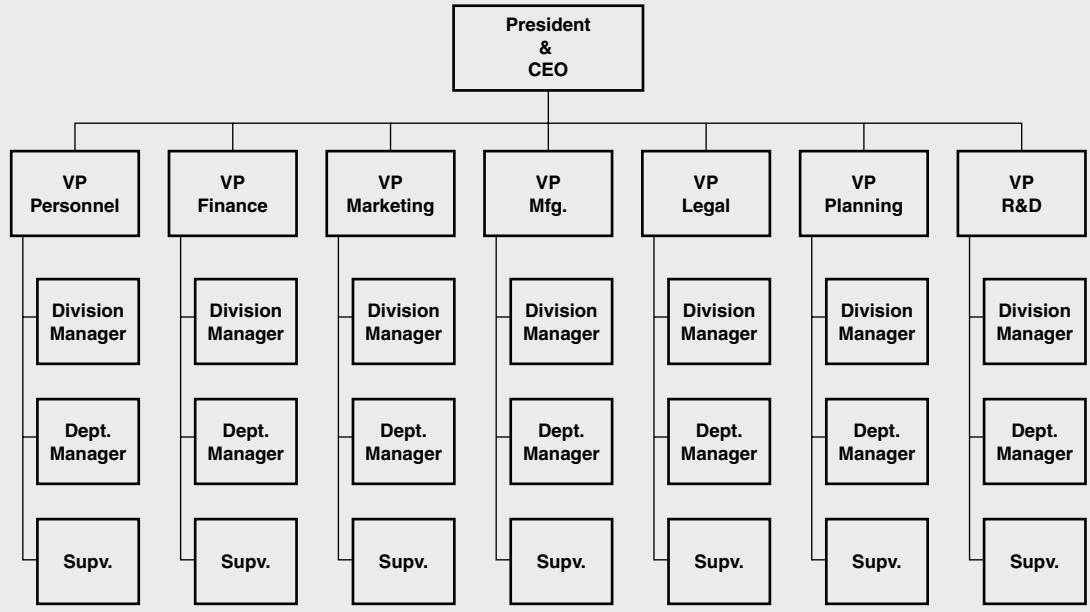
Traditional organizations integrated work vertically; that is, they delegated authority in a pyramidal, hierarchical structure. As the pyramid shape suggests, power was concentrated primarily among the handful of individuals at the top. This organizational form, shown in Figure 1, was first developed in the United States in the late 19th century with the advent of mass production.

The prominent theorist of traditional hierarchical organizations was the renowned industrial engineer, Frederick Winslow Taylor. His book, *Principles of Scientific Management,* introduced the principles for designing and managing mass-production facilities such as Ford's automobile factory in Michigan and Carnegie's steel works in Pittsburgh.

The hierarchical structure was designed to manage highly complex processes like automobile assembly where production could be broken down into a series of simple steps. Hierarchical corporations often controlled and managed all activities of a business from, the raw materials to their allocation to consumers. A centralized managerial hierarchy controlled the entire production process, with white-collar workers establishing rules and procedures to manage a blue-collar workforce.

From World War II until the early 1980s, the trend was to build increasing layers of management with more staff specialists. This centralized hierarchical structure

Figure 1
The Traditional Hierarchy



was seen as effective for managing large number of workers, but lacked agility and was unable to process information rapidly throughout the organization.

NEW DEMANDS ALTER ORGANIZATIONAL FORMS

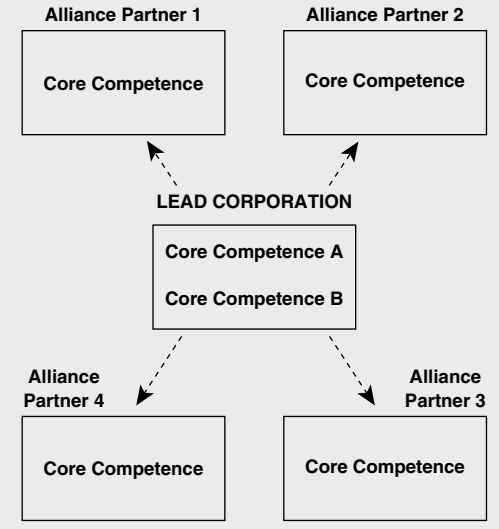
Since the 1980s, many organizations have flattened their structures by shifting authority downward, giving employees increased autonomy and decision-making power. Advantages of flatter organization forms include a decreased need for supervisors and middle management, faster decision making, and the ability to process information faster because of the reduced number of layers in the organization.

A consequence of flatter organizations, though, is that employees tend to be more dispersed both geographically and organizationally. Responding to this problem of dispersion, many organizations have eliminated superfluous processes and begun focusing on their core, value-added business. Flat organizations using joint ventures and strategic alliances are providing increased flexibility and innovation, and are replacing many traditional hierarchies.

THE NEW BUSINESS FORM

Ray Grenier and George Metes discuss the shift to this new organizational structure as a response to unprecedented customer expectations and alternatives, global competition, time compression, complexity, rapid change, and increased use of technology. They describe the virtual model as a lead organization that creates alliances with groups and individuals from different organizations who possess the highest competencies to build a specific product or service in a short period of time (see Figure 2).

Figure 2
The Virtual Corporation - A network of organizations working independently to bring a product to market



Grenier and Meters further explain that these alliances are virtual because products and services are not produced in a single corporation whose purpose is longevity. Rather, these new virtual organizations consist of a hybrid of groups and individuals from different companies that might include customers, competitors, and suppliers who have a focused purpose of bringing a high-quality product or service to market as rapidly as possible. These alliances may be temporary with short concept-to-delivery cycles.

William Davidow and Michael Malone, authors of *The Virtual Corporation,* claim that virtual corporations will be central to the new business revolution. Their concept of the virtual corporation brings diverse innovations together such as just-in-time supply, work teams, flexible manufacturing, reusable engineering, worker empowerment, organizational streamlining, computer-aided design, total quality, and mass customization into a coherent vision for the twentieth century corporation.

The virtual corporation is more permeable than traditional organizational forms. Interfaces in a virtual organization between company, supplier, and customers continuously change, resulting in a blurring of traditional functions. Inside the office, work groups and job responsibilities may shift regularly. The virtual organization may not have a central office or an organizational chart. Suppliers, customers, and even competitors may spend time alongside one another in the virtual organization.

CHARACTERISTICS OF A VIRTUAL ORGANIZATION

Partners in virtual organizations share risks, costs, and rewards in pursuit of a global market. The common characteristics of these organizations include a purpose that is motivated by specific market opportunities, world-class core competence, information networks, interdependent relationships, and permeable boundaries.

Virtual organizations represent structures that are motivated by specific market opportunities. Once the alliance has been formed and the opportunity has been exploited, partners may move on to new partnerships and alliances.

Each partner in a virtual corporation contributes a world-class core competence, such as design, manufacturing, or marketing. This ability of multiple firms to create synergies among world-class functions and processes creates untold possibilities.

As organizations create these new linkages, advanced information technology becomes an important element, and key to the success of a virtual organization. Computerized information systems allow employees from geographically dispersed locations to link up with one another. The virtual office may use desktop videoconferencing, collaborative software, and intranet systems to enhance the flow of information among team members. Besides the need for instantaneous communication with one another, members of these autonomous virtual teams have increasing requirements regarding the amount and quality of information they need to do their work.

Members of the virtual organization, in turn, create a network of interdependent relationships. These relationships require firms to be much more dependent on one another than they have been in the past, demanding unprecedented levels of trust. Strong interdependencies cause organizations' boundaries to be blurred as competitors, suppliers, and customers enter into cooperative agreements. These new relationships among firms obligate organizations to use innovative management practices.

VIRTUAL TEAMS

Virtual teams are often the group structure used in virtual organizations. Jessica Lipnack and Jeffrey Stamps define virtual teams as "a group of people who interact through interdependent tasks guided by a common purpose." Unlike conventional teams, a virtual team performs work across space, time, and organizational boundaries connected by interactive communication technologies. Virtual teams may include employees, management, customers, suppliers, and government working together to achieve common goals. These teams often stay together only to perform its episodic task. They may work jointly on a new project, but when the product is designed and goes into production, the project is finished and the virtual team dissolves.

Lipnack and Stamps offer three key features for a successful virtual team. One is the choice of team members with the appropriate skills and knowledge for the task; second is the definition of a purpose to steer the group; and third is the effective linking of team members, including communication channels, interactions, and relationships.

Virtual team members are required to learn a new set of skills. One skill is the ability to interact with one another effectively despite infrequent or total lack of face-to-face contact. Another is the ability to assimilate quickly and effectively into new teams. Virtual team members should be technically adept to deal with the variety of required computer-based technologies. Additionally, virtual team members may need intercultural skills to work effectively in multi-national organizations.

VIRTUAL LEADERS

Greiner and Metes discuss the new leadership skills required to lead in the virtual environment, including the ability to manage a network of interdependent firms, to

design virtual operations, to create and sustain virtual relationships with internal as well as external constituents, to support virtual teams, and to keep virtual teams focused. The leader of a virtual organization demands a new set of skills unlike the skills required in a traditional hierarchy.

VIRTUAL LEARNING

Another critical element to the success of the virtual organization is the ability of the organization to create world-class learning systems. These learning systems help leaders sustain or create world-class competencies. Effective learning systems can create pathways throughout the organization, in network fashion, enhancing the innovative capabilities of the organizational members. An organization's ability to sustain a leadership position in the world economy demands that organizations be on the cutting edge to develop rapid and elegant solutions to emerging consumer demands.

EXAMPLES OF VIRTUAL ORGANIZATIONS

An industry that is known for its use of partners and alliances is the entertainment industry, which has partnered with the computing, communications, consumer electronics, and publishing industries to convert movies, textbooks, and other software into digital formats.

Increasing numbers of firms are moving to these new organizational forms. Corning, the glass and ceramics maker, is one such firm known for making partnerships work to their advantage. Corning has partnered with such firms as Siemens, Germany's electronics conglomeration, and Vitro, Mexico's largest glassmaker. Alliances are so important to Corning's business strategy that the corporation has defined itself as a network of organizations.

Computer organizations that have successfully implemented forms of this new structure include Apple Computer and Sun Microsystems. When Apple Computer linked its easy-to-use software with Sony's manufacturing skills in miniaturization, Apple was able to get its product to market quickly and gain a market share in the notebook segment of the PC industry.

Sun Microsystems has been considered another highly decentralized organization comprised of independently operating companies. Sun positions information systems as a top priority, trying to achieve faster and better communication. With numerous "SunTeams," members operate across time, space, and organizations to address critical business issues. Sun managers identify key customer issues and then form teams with the critical skills and knowledge needed to address the issue. This team might include sales people, marketing personnel, finance, and operations from various places around the globe; customers and suppliers may become episodic members as necessary. Weekly meetings may take place via conference calls. Critical to the team's success is the selection of talent from the organization, defining a clear purpose for the team's efforts, and establishing communication links among the team members.

Sun has been working on further development of technologies such as EDI (Electronic Data Interchange) and RFID (Radio Frequency Identification technology). Both EDI and RFID will impact information exchange globally and across numerous industries.

CHALLENGES

Virtual organizations can be very complex and problematic; they fail as often as they succeed. Among the many challenges of the virtual organization are strategic planning dilemmas, boundary blurring, a loss of control, and a need for new managerial skills.

Strategic planning poses new challenges as virtual firms determine effective combinations of core competencies. Common vision among partners is quintessential to cooperating firms. Focused on a common goal, firms develop close interdependencies that may make it difficult to determine where one company ends and another begins. The boundary-blurring demands that these boundaries be managed effectively. Coordinating mechanisms are critical elements for supporting these loose collections of firms.

Virtual structures create a loss of control over some operations. This loss of control requires communication, coordination, and trust among the various partners, as well as a new set of managerial skills. Employees are exposed to increased ambiguity about organizational membership, job roles and responsibilities, career paths, and superior-subordinate relationships. This ambiguity requires management to rethink rewards, benefits, employee development, staffing and other employee-related issues. Developing leaders who are able to create and sustain these organizational forms is critical.

Les Pang offers a list of best practices, based on a review of successful implementations of virtual organizations.

- Foster cooperation, trust and empowerment.
- Ensure each partner contributes and identifiable strength or asset.
- Ensure skills and competencies are complementary, not overlapping.
- Ensure partners are adaptable.
- Ensure contractual agreements are clear and specific on roles and deliverables.

- If possible, do not replace face-to-face interaction entirely.
- Provide training that is critical to team success.
- Recognize that it takes time to develop the team.
- Ensure that technology is compatible and reliable.
- Provide technical assistance that is competent and available.

FUTURE OF VIRTUAL ORGANIZATIONS

The business environment will no doubt require firms to become even more flexible, more agile, and to bring products and services to market at an increasing rapid pace. Traditional organization forms are no longer capable of sustaining the needs of this relentless pace. New forms of organizing, such as the virtual organization, hold promise as organizational leaders experiment and learn new strategies for managing in the twenty-first century and beyond. These new structures, however, will require managers and leaders to face exciting challenges as they move into an environment of increased uncertainty and volatility.

SEE ALSO: Lean Manufacturing and Just-in-Time Production; Organizational Structure; Teams and Teamwork; Trends in Organizational Change

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VISION STATEMENTS

SEE: Mission and Vision Statements